UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
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OFFICE OF THE REGIONAL ADMINISTRATOR

JUN 27 2016

Colonel Michael Brooks
Alaska District Engineer
U.S. Army Corps of Engineers
P.O. Box 6898
JBER, Alaska 99506-0898

Dear Colonel Brooks:

This letter is in further reference to Public Notice POA-1995-120 and the Draft Environmental Impact Statement prepared by the Alaska District. The PN and DEIS describe Donlin Gold, LLC's proposal to produce gold from ore reserves owned by Calista Corporation ten miles north of the Kuskokwim River village of Crooked Creek, Alaska.

The PN and DEIS indicate that the proposed project would discharge over 984 million cubic yards of fill material into approximately 9,758 acres of jurisdictional waters of the United States, including into 56 linear miles of streams. An additional 1,096 acres of jurisdictional waters would be impacted by land clearing, and over 5,000 acres would experience secondary impacts due to groundwater drawdown and fugitive dust from the proposed mine components.

Based on the U.S. Environmental Protection Agency's review of the available information, and pursuant to Part IV, paragraph 3(a) of the 1992 Clean Water Act Section 404(q) Memorandum of Agreement between the EPA and Department of the Army, the EPA notified the District by letter dated May 31, 2016, that the proposed discharges may result in substantial and unacceptable impacts to aquatic resources of national importance (3(a) letter).

On May 31, 2016, the EPA also provided the District with extensive comments specific to the DEIS via an independent letter and attached comment matrix. That letter was submitted pursuant to our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act. Section 309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal agency actions to which NEPA applies.

The detailed discussions in our 3(a) and Section 309 letters are incorporated by reference and will not be repeated here.

Our 3(a) letter identified both the Kuskokwim River and Crooked Creek, along with its adjacent wetlands, and its tributaries American and Anaconda creeks, as aquatic resources of national importance. The EPA has received no new information regarding the issues we raised in our 3(a) letter. Pursuant to Part IV, paragraph (3)(b) of the MOA, the EPA hereby notifies the District that in the EPA's opinion the discharges associated with the proposed project will have a substantial and unacceptable impact on aquatic resources of national importance.

Per the MOA, the attached enclosure identifies the specific impacts as well as the need to modify, condition, or deny the Section 404 permit to protect the aquatic resources. The information about potential impacts and measures that could serve to reduce their severity is taken directly from the PN and DEIS.

The MOA requires the EPA's 3(a) and 3(b) letters to be submitted in response to the Section 404 PN. As described in our (3)(a) and Section 309 letters, however, the Section 404 PN and the DEIS lack required information about the extent and nature of the project's potential impacts on aquatic resources. The EPA considers it unfortunate that the District chose to issue the PN concurrent with the DEIS prior to completing its analysis of project impacts and compliance with the Section 404(b)(1) Guidelines.

Because the EPA's opinions are based on the incomplete information and analyses in the PN and DEIS, they are preliminary and subject to change in accord with future information. We strongly urge the District to complete and share its analyses of project impacts and 404(b)(1) compliance with the EPA as soon as possible so that we may resolve these issues in a timely fashion.

I appreciate the attention that you and your staff have provided to this project, and Region 10 looks forward to discussing our concerns. Should you choose to issue the proposed permit, please provide notice to the EPA in accordance with Part IV, paragraph (3)(c) of the MOA. Should you have any questions about this letter and the attached enclosure, please do not hesitate to contact me or have your staff contact Matthew LaCroix in our Alaska Operations Office at (907) 271-1480, or by email at lacroix.matthew@epa.gov.

Sincerely,

Dennis J. McLerran
Regional Administrator

Enclosure

cc: Karen Clark, Acting Regional Director, USFWS
Sheila Newman, Project Manager, USACE

Enclosure to EPA's 3(b) Letter on Public Notice POA-1995-120

The proposed discharges will result in substantial and unacceptable adverse impacts to the Kuskokwim River.

Proposed fill discharges for project components would occur in multiple watersheds, with some of the more substantial direct and secondary impacts occurring along the lower and middle Kuskokwim River.

The Kuskokwim River is the second largest river in Alaska, measured both by length (702 miles) and discharge. The River's discharge of 67,000 cubic feet per second is approximately the same as that of the Missouri River in the continental United States. The numerous Alaska native communities located along the River rely on it for domestic water, subsistence fishing and cultural uses, recreation, and transportation. The Kuskokwim River provides essential fish habitat for all five species of Pacific salmon. The River supports one of the largest subsistence fisheries in Alaska as well as a substantial commercial salmon fishery.

The DEIS indicates the project has the potential to interfere with commercial and local navigation along the River, including for subsistence activities. In particular, the increase in diesel and cargo barge traffic during the mine life would result in additional boat wakes, induced shoreline erosion and bed scour, impacts to fish habitat, and the potential for barge groundings and accidental spills.

Detailed hydrologic modeling to predict the geomorphic effects of project-related barge traffic has not been done, but the DEIS does provide information about some of the related impacts. For example, Section 3.21-166 states that: "*Barging could potentially affect subsistence fishing by generating propeller wash and wakes that could interfere with fish nets, fish cutting rafts or fish wheels, and processing rafts, or erode river banks so that people either have to abandon or move fish camps.*"

Many of the potential impacts of barge traffic to fish habitat in the Kuskokwim River are poorly understood. Information about the specific micro habitats used by some fish species during different life stages such as spawning, rearing, and overwintering is limited. In addition, the processes that establish and maintain specific habitats are influenced by complex relationships between river stage and sediment transport. In contrast, the potential impacts to rainbow smelt are better understood.

Rainbow smelt are an important subsistence resource for residents along the Kuskokwim River. Baseline data collected for the DEIS indicate that the smelt are essentially a single population that spawns within a very limited area of the River. The DEIS indicates that prop wash scour from the increased barge traffic could alter the riverbed substrates and fish spawning gravel itself. The greater threat is that the prop wash could directly impact smelt eggs incubating in the gravel.

The potential loss of rainbow smelt production due to the prop wash from barges is not quantified, but Section 3.13 indicates that a high level of injury or mortality to incubating rainbow smelt eggs from prop wash would be unavoidable unless barge traffic were prohibited during smelt spawning and incubation. Table 3.13-30 identifies the Geographic Extent of prop wash scour of riverbed substrates and fish spawning gravel in the Kuskokwim River as "Local." Although the impacts to the riverbed would in fact be "local," impacts to smelt spawning locations would have population-level implications that would be felt at least regionally.

Much of the project-related barge traffic would be associated with the transport of diesel fuel to the mine site. Natural gas would provide the power for the mine itself, but diesel would power the large 300-ton trucks that would transport waste rock and ore from the open pit. The DEIS indicates that the large trucks account for 75 percent of the total annual diesel consumption for the project. Two mechanisms for reducing the impacts of barge traffic are evaluated in the DEIS. The first of these is to reduce the *use* of diesel by mine trucks, and the second is to reduce the *barging* of diesel on the Kuskokwim River.

Alternative 3A would reduce the *use* of diesel by using LNG-powered haul trucks. This would, in turn, reduce the amount of diesel transported throughout the supply chain, and ultimately, on the Kuskokwim River to the mine site. Constructing an LNG facility at the mine site and using LNG to power the haul trucks would reduce peak annual diesel consumption by 69 percent, and reduce total peak barge traffic by 67 percent (from 58 round trips to 19) during mine operations. Tanker truck traffic from the Jungjuk Port to the mine site would also be reduced by 75 percent during operations.

The number of joint cargo/fuel barge trips would also be reduced by 32 percent, from 122 round trips to 83. Ocean barging of diesel fuel from the Pacific Northwest to Dutch Harbor would be reduced from seven round trips per year to two. Fuel barge trips from Dutch Harbor to Bethel would be reduced from fourteen to five, and the proposed additional diesel fuel storage in Bethel could be reduced or eliminated.

If LNG and/or natural gas were used for other mine vehicles in addition to the haul trucks, that would further reduce the need for diesel as vehicle fuel. LNG powered haul trucks of the size proposed for the mine are not currently available, but they might be available by the time a mine is developed.

Alternative 3B would eliminate diesel *barging* and the associated impacts to the Kuskokwim River by transporting diesel to the mine site via pipeline rather than barge. Barge traffic on the River would be exclusive to cargo; and barge trips would be reduced by 48 percent during operations, from 122 round trips per year to 64 round trips.

Diesel fuel would be delivered to the Tyonek North Foreland Facility on the west side of Cook Inlet. The existing dock would be extended by 1,500 feet to accommodate larger delivery

vessels. This facility is nineteen miles from the start of the proposed pipeline route at Beluga. A diesel pipeline spur would span this distance.

The DEIS evaluates construction of a diesel pipeline as an alternative to the proposed natural gas pipeline. Diesel fuel would be used for vehicle fuel and to generate electricity for the mine. As evaluated, this alternative would eliminate natural gas use and triple diesel use. The potential to construct parallel natural gas and diesel pipelines should be evaluated.

The proposed discharges will result in substantial and unacceptable adverse impacts to Crooked Creek, its wetlands, and tributaries.

Crooked Creek is a tributary of the Kuskokwim River, and a majority of the project's direct and secondary impacts would occur in the Creek's watershed. Development of the mine would result in the permanent loss of over five thousand acres of wetlands and over 13 miles of streams, including the Crooked Creek tributaries of American and Anaconda creeks. The 2,240-acre waste rock facility (WRF) and 2,351-acre tailings storage facility (TSF) would bury the upper reaches of American and Anaconda creeks, respectively, while the 1,462-acre mine pit would eliminate the lower reach of American Creek. Both American and Anaconda creeks are anadromous and support coho salmon in their lower reaches.

Crooked Creek itself supports all five species of Pacific salmon, with a staggered distribution. The range of coho salmon extends upstream of the proposed mine site. Chinook salmon are found up to the confluence of American Creek; while pink, sockeye, and chum salmon are found downstream of the proposed mine site.

Development of the mine pit, WRF, and TSF would permanently alter the contours of the landscape. Dewatering of the mine pit would alter groundwater flow to the Creek. These changes, coupled with the loss of wetland acreage and surfaces streams, would permanently alter the surface and groundwater flow paths from the watershed to Crooked Creek. The consequences would be permanent modification of the hydrology, chemistry, and aquatic habitat of Crooked Creek.

Mine operations would use virtually all of the surface and groundwater from the vicinity of the mine that currently makes its way to Crooked Creek. The DEIS states that even in years of average precipitation, the capture of surface runoff and pit dewatering *"would not be able to meet process plant water requirements."* [DEIS 2-27] The necessary additional process water would be obtained from the proposed Snow Gulch reservoir.

The DEIS indicates that modeled reductions in Crooked Creek flow are as high as 100 percent. Section 3.13-109 states that *"Should the underlying geology of Crooked Creek reflect a high level of hydraulic conductivity, flow reductions in Crooked Creek between American Creek and Crevice Creek could be as high as 85 to 100 percent during Year 20 of operations. Farther downstream in Crooked Creek, flow reductions of 40 to 31 percent could occur near Getmuna and Bell creeks, respectively (BGC 2015c). In this case, predicted streamflow reductions of such*

a high intensity would result in major impacts to salmon production in the middle and lower reaches of Crooked Creek."

The winter flow reductions could result in more than two miles of the Creek channel going completely dry, with impacts to incubating fish eggs in the gravel, as well as rearing, migration, and spawning habitat. The DEIS states that *"Under these conditions, flow reductions in the vicinity of the mine site during winter months could result in Crooked Creek freezing to the bottom between American Creek and Omega Gulch, with much of the flow restored below Crevice Creek (28 to 40 percent reductions) due to tributary inflows. Potential impacts to fish and aquatic habitat resulting from reduced flow during winter conditions are described in Section 3.13, Fish and Aquatic Resources."*[DEIS 3.5-83]

The DEIS states that flow reductions at this scale would cause major impacts. Table 3.13-30 identifies major impacts to: overall aquatic habitat; mainstem and off-channel aquatic habitat; salmon spawning habitat; and to salmon production in Crooked Creek. The potential loss of production of non-salmonids does not appear to have been evaluated.

Although the impacts to aquatic habitat are characterized as major, the DEIS evaluates potential impacts to salmon production in the context of total production for the Kuskokwim River drainage. *"Therefore, while impacts to Crooked Creek salmon production resulting from predicted flow reductions would range from moderate to major (depending on whether a High K scenario is considered), the context of such impacts relative to total salmon production in the overall Kuskokwim River drainage would be considered minor."* (Section 3.13-109)

It may be appropriate to consider the loss of salmon production from the mine in the context of *"...total salmon production in the overall Kuskokwim River drainage..."*, but that is not the only context in which to evaluate this loss.

The loss of salmon production may be minor to the agencies responsible for managing "total salmon production" in the drainage, but local residents do not have access to the entire Kuskokwim River drainage or to the total salmon production. The loss of local fish translates into the loss of local opportunities. Residents will need to travel farther to access non-local fish, increasing fuel and time expenditures. The additional travel will increase risk, including the risk of increased spoilage, and will leave less time for other activities. It will increase competition for other fish stocks and with other users. We believe the geographic extent of the impact from the loss of salmon production in Crooked Creek would be more than "Local."

Under more optimistic model assumptions, flow reductions are predicted to be 15-20 percent. Reductions of this scale would still substantially alter the hydrograph of Crooked Creek. This would change the water chemistry and temperature, alter sediment transport processes and the amount and availability of instream habitat, and interfere with fish passage. Reduced flow in the reach adjacent to the mine could result in bed aggradation and debris stranding. Over time, the channel could shift from single-thread to braided, with the potential for channel avulsions.

The range of stream flows would be shifted downward, with fewer high flow and overbank events. This would affect the riparian disturbance regime and floodplain connectivity. Section 3.13-96 states:

> *"Reduced flows also could affect the frequency with which off-channel habitat maintains connection with the main channel. This is an important consideration because although off-channel habitats would likely re-connect to the main channel at some point during the year when the water stage increases, connections may no longer occur during very low flow periods in summer and winter resulting in temporary isolation of off-channel habitats from the main channel. This could affect rearing or spawning life phases of fish due to fish stranding and potential mortalities. Furthermore, a reduction in off-channel (or in-channel) winter habitat may adversely affect the survival of overwintering fish or incubating eggs if flows are reduced to the point where the water column becomes too shallow or freezes completely."*

A stream's flow regime, including the daily, seasonal, annual, and flood fluctuations, is key to its functioning. Numerous case studies in the literature indicate that altering a stream's hydrograph by more than 10 percent causes measurable changes in ecosystem structure. Streamflow alteration greater than 20 percent causes moderate to major changes in ecosystem structure and function, with impacts becoming more significant as alteration increases beyond 20 percent.

In a 2011 article titled *A Presumptive Standard for Environmental Flow Protection*, Richter *et al.* indicated that protecting a minimum of 80% of daily flows is necessary to maintain ecological integrity in most rivers.

Many of the potential impacts to Crooked Creek, its adjacent wetlands, and its tributaries American and Anaconda creeks would be unavoidable if the mine is developed. The DEIS does, however, identify how impacts to wetlands along Anaconda Creek can be reduced. The potential for direct and secondary impacts associated with construction of the TSF and its 464-foot high dam can be substantially reduced through the adoption of Alternative 5A.

Under Alternative 5A, mine tailings would be managed as a dry stack. The DEIS indicates that up to 80 percent of the moisture from the mine tailings could be removed to create dry pastes. Removing the majority of water from the tailings increases their stability, and minimizes the potential contamination of downgradient surface and groundwater from mine tailings in the event of a breach in the storage facility dam and/or a rupture of the liner.

Dry stack tailings reduce the risk of some tailings dam failure modes, such as piping and cracking through the embankment, and foundation failure. They are also much less mobile than saturated tailings, which reduces the risk of a catastrophic tailings release in the event of a minor problem with the dam.

The DEIS includes modeling of a minor tailings dam breach where 0.5 percent of the total tailings volume was released. The model was of saturated tailings with 50 percent water and 50 percent solids. The results indicate that 2.6 million cubic yards of tailings would reach the

Kuskokwim River and up to ten feet of tailings would be deposited at the confluence of Anaconda Creek and Crooked Creek.

Removing water from the tailings consolidates their volume by about 40 percent, so the area needed for a dry-stack TSF is substantially less than for saturated tailings. Water removed from the tailings would report to an operating pond, and be pumped back to the process plant for reuse. This would increase the efficiency of process water use and minimize the need for make-up water from the Snow Gulch reservoir.

At mine closure, the operating pond water would be pumped to the pit and the footprint of the operating pond reclaimed. Reclamation of the operating pond is projected to take five years. Reestablishing wetlands within this footprint post mining, and the increased efficiency in water use during operations would reduce impacts to Crooked Creek relative to the proposed saturated tailings.

Whether designed to manage saturated or dry stack tailings, the TSF is a waste treatment system. This affects how impacts associated with the discharge of tailings to the TSF are evaluated. EPA requests that the District coordinate with us regarding evaluation of the TSF impacts.

The DEIS does not identify the least environmentally damaging practicable alternative (LEDPA). The 404(b)(1) Guidelines prohibit any alternative other than the LEDPA. The information presented in the PN and DEIS indicate that the LEDPA would include a combination of project components from Alternative 2, Alternative 3A, Alternative 3B, and Alternative 5A.

The potential of the proposed discharges to cause or contribute to significant degradation should be evaluated in the EIS.

We have highlighted a number of project alternatives evaluated in the DEIS, which would serve to avoid and minimize impacts to the Kuskokwim River and Crooked Creek. As referenced above, however, some of the potential impacts to Crooked Creek, its adjacent wetlands, and American and Anaconda creeks would be unavoidable. The DEIS characterizes many of these impacts as major. The compensatory mitigation projects identified by Donlin would do little to reduce the severity of the impacts. For example, they would not directly offset the Crooked Creek flow reductions.

The severity of individual impacts identified in the DEIS, and the cumulative impact of multiple less-severe impacts suggest that the project has the potential to cause significant degradation. Pursuant to 40 CFR § 230.10(c),

> *"...no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those subparts."*

The referenced subparts of the Guidelines identify impacts such as: the alteration of normal water fluctuations; modification of habitat, including spawning areas; restricting the movement of aquatic life; and interfering with the reproductive success of commercially important species [§ 230.24(b), 230.51(b)] as potentially causing or contributing to significant degradation.

The evaluation of the potential for significant degradation is necessary to demonstrate compliance with the Section 404(b)(1) Guidelines; and 40 CFR § 230.11 requires the factual determinations to be in writing. We believe the evaluation of potential short- and long-term effects of proposed discharges are precisely the type of analyses that should be included in the EIS. We once again call upon the District to include the "*...appropriate factual determinations, evaluations, and tests...*" in the EIS.